

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A plasma processing apparatus for performing a process on a substrate by exposing the substrate to a plasma, the apparatus comprising:

a chamber for accommodating therein the substrate, the chamber including side walls;

a dielectric top plate member disposed on an upper portion of the chamber;

an antenna having a plurality of slots for irradiating a microwave towards an inside of the chamber through the top plate member, the antenna being disposed on the top plate member and being in close contact therewith;

a gas injection opening for supplying a processing gas into the chamber; and

a vacuum pump for exhausting the inside of the chamber,

wherein the top plate member includes:

a dielectric flat plate portion formed to face the substrate, the dielectric flat plate portion extending substantially horizontally to the chamber side walls; and

a dielectric sidewall portion formed to extend from a peripheral region of the flat plate portion along the chamber side walls towards the substrate in a plasma generation region,

wherein sides of the flat plate portion and the sidewall portion have a curved surface facing the plasma generation region and extending between the flat plate portion and the sidewall portion and a thickness of the sidewall portion has a thickness between the chamber sidewalls and the plasma generation region is constant and is not smaller than $\lambda_g/4$ but not greater than λ_g , λ_g being a wavelength of the microwave, and a thickness of the flat plate portion between the antenna and the plasma generation region is not smaller than $\lambda_g/4$ but not greater than λ_g , λ_g being a wavelength of the microwave, and

wherein the microwave propagates from the flat plate portion to the sidewall portion and then is supplied towards a periphery portion of the substrate, thereby enhancing a uniformity of a plasma density in a radial direction of the substrate.

Claims 2-4 (Canceled).

Claim 5 (Previously Presented): The plasma processing apparatus of claim 1, wherein the gas injection opening is disposed to inject the gas along the sidewall portion.

Claim 6 (Previously Presented): The plasma processing apparatus of claim 1, wherein an outer periphery of the sidewall portion is covered with a conductor.

Claim 7 (Previously Presented): The plasma processing apparatus of claim 1, wherein an inner shape of the top plate member is of a bell jar type.

Claim 8 (Canceled).

Claim 9 (Previously Presented): The plasma processing apparatus of claim 6, wherein a gap is provided between the sidewall portion and the conductor.

Claim 10 (Previously Presented): The plasma processing apparatus of claim 6, wherein the sidewall portion is in close contact with the conductor without having a gap therebetween.

Claim 11 (Currently Amended): A plasma processing apparatus for performing a process on a substrate by exposing the substrate to a plasma, the apparatus comprising:

a chamber for accommodating therein the substrate, the chamber including side walls;
a dielectric top plate member disposed on an upper portion of the chamber;
an antenna having a plurality of slots for irradiating a microwave towards an inside of the chamber through the top plate member, the antenna being disposed on the top plate member and being in close contact therewith;

a gas injection opening for supplying a processing gas into the chamber; and
a vacuum pump for exhausting the inside of the chamber,
wherein the top plate member includes:

a dielectric flat plate portion formed to face the substrate, the dielectric flat plate portion extending substantially horizontally to the chamber side walls; and

a dielectric sidewall portion formed to extend from a peripheral region of the flat plate portion along the chamber side walls towards the substrate in a plasma generation region,

wherein sides of the flat plate portion and the sidewall portion have a curved surface facing the plasma generation region and extending between the flat plate portion and the sidewall portion and a gap distance between the top plate member and the antenna is equal to or smaller than $\lambda_g/10$, λ_g being a wavelength of the microwave, [[and]]

wherein the microwave propagates from the flat plate portion to the sidewall portion and then is supplied towards a periphery portion of the substrate, thereby enhancing a uniformity of a plasma density in a radial direction of the substrate,

wherein a thickness of the sidewall portion has a thickness between the chamber sidewalls and the plasma generation region is constant and is not smaller than $\lambda_g/4$ but not greater than λ_g , ~~λ_g being a wavelength of the microwave~~ and a thickness of the flat plate portion between the antenna and the plasma generation region is not smaller than $\lambda_g/4$ but not greater than λ_g , λ_g being a wavelength of the microwave.

Claims 12-14 (Canceled).

Claim 15 (Previously Presented): The plasma processing apparatus of claim 11, wherein the sidewall portion has a thickness not smaller than $\lambda_g/4$ but not greater than λ_g , λ_g being a wavelength of the microwave.

Claims 16-17 (Canceled).

Claim 18 (Previously Presented): The plasma processing apparatus of claim 11, wherein an inner shape of the top plate member is of a bell jar type.

Claim 19 (Previously Presented): The plasma processing apparatus of claim 11, wherein the gas injection opening is disposed to inject the gas along the sidewall portion.

Claims 20-22 (Canceled).

Claim 23 (Previously Presented): The plasma processing apparatus of claim 1, wherein all microwave irradiated towards the inside of the chamber are introduced through the slots and the top plate.

Claim 24 (Previously Presented): The plasma processing apparatus of claim 11, wherein all microwave irradiated towards the inside of the chamber are introduced through the slots and the top plate.